What is claimed is

1. A coding method comprising:

slicing audio data so that sliced audio data corresponds to a plurality of layers;

obtaining scale band information and coding band information corresponding to each of the plurality of layers;

coding additional information containing scale factor information and coding model information based on scale band information and coding band information corresponding to a first layer;

obtaining quantized samples by quantizing audio data corresponding to the first layer with reference to the scale factor information;

coding the obtained plurality of quantized samples in units of symbols in order from a symbol formed with most significant bits (MSB) down to a symbol formed with least significant bits (LSB) by referring to the coding model information; and

repeatedly performing the steps with increasing the ordinal number of the layer one by one every time, until coding for the plurality of layers is finished.

2. The method of claim 1, further comprising, before the coding of additional information,

obtaining a bit range allowed in each of the plurality of layers, wherein in the coding of the obtained plurality of quantized samples, the number of coded bits is counted, and if the number of counted bits exceeds a bit range corresponding to the bits, coding is stopped, and if the number of counted bits is less than the bit range corresponding to the bits even after quantized samples are all coded, bits that remain not coded after coding in a lower layer is finished are coded to the extent that the bit range permits.

3. The method of claim 1, wherein the slicing of audio data comprises:

performing a wavelet transform of audio data; and

slicing the wavelet-transformed data by referring to a cut-off frequency so that the sliced data corresponds to the plurality of layers.

4. The method of claim 1, wherein the coding of the plurality of quantized samples comprises:

mapping a plurality of quantized samples on a bit plane; and

coding the samples in units of symbols within a bit range allowed in a layer corresponding to the samples in order from a symbol formed with MSB bits down to a symbol formed with LSB bits.

5. The method of claim 4, wherein in the mapping of the plurality of quantized samples, K quantized samples are mapped on a bit plane, and in the coding of the samples, a scalar value corresponding to the symbol formed with K-bit binary data is obtained, and Huffman coding is performed by referring to the K-bit binary data, the obtained scalar value, and a scalar value corresponding to a symbol higher than a current symbol on the bit plane, where K is an integer.

6. A method for decoding audio data that is coded in a layered structure, with scalability, comprising:

differential-decoding additional information containing scale factor information and coding model information corresponding to a first layer;

Huffman-decoding audio data in units of symbols in order from a symbol formed with MSB bits down to a symbol formed with LSB bits and obtaining quantized samples by referring to the coding model information;

inversely quantizing the obtained quantized samples by referring to the scale factor information;

inversely MDCT transforming the inversely quantized samples; and

repeatedly performing the steps with increasing the ordinal number of the layer one by one every time, until decoding for a predetermined plurality of layers is finished.

7. The method of claim 6, wherein the Huffman-decoding of audio data comprises:

decoding audio data in units of symbols within a bit range allowed in a layer corresponding to the audio data, in order from a symbol formed with MSB bits down to a symbol formed with LSB bits; and

obtaining quantized samples from a bit plane on which decoded symbols are arranged.

8. The method of claim 7, wherein in decoding audio data, a 4*K bit plane formed with decoded symbols is obtained, and in obtaining quantized samples, K quantized samples are obtained from the 4*K bit plane, where K is an integer.

9. An apparatus for decoding audio data that is coded in a layered structure, with scalability, comprising:

an unpacking unit which decodes additional information containing scale factor information and coding model information corresponding to a first layer, and by referring to the coding model information, decodes audio data in units of symbols in order from a symbol formed with MSB bits down to a symbol formed with LSB bits and obtaining quantized samples;

an inverse quantization unit which inversely quantizes the obtained quantized samples by referring to the scale factor information; and

an inverse transformation unit which inverse-transforms the inversely quantized samples.

10. The apparatus of claim 9, wherein the unpacking unit decodes audio data in units of symbols within a bit range allowed in a layer corresponding to the audio data, in order from a symbol formed with MSB bits down to a symbol formed with LSB bits, and obtains quantized samples from a bit plane on which decoded symbols are arranged.

11. The apparatus of claim 10, wherein the unpacking unit obtains a 4*K bit plane formed with decoded symbols and then, obtains K quantized samples from the 4*K bit plane, where K is an integer.

12. An apparatus for coding audio data with scalability comprising:

a transformation unit which MDCT transforms the audio data;

a quantization unit which quantizes the MDCT-transformed audio data corresponding to each layer, by referring to the scale factor information, and outputs quantized samples; and

a packing unit which differential-codes additional information containing scale factor information and coding model information corresponding to each layer, and Huffman-codes the plurality of quantized samples from the quantization unit, in units of symbols in order from a symbol formed with most significant bits (MSB) down to a symbol formed with least significant bits (LSB) by referring to the coding model information.

13. The apparatus of claim 12, wherein the packing unit obtains scale band information and coding band information corresponding to each of the plurality of layers, and codes additional information containing scale factor information and coding model information based on scale band information and coding band information corresponding to each layer.

14. The apparatus of claim 12, wherein the packing unit counts the number of coded bits and if the number of counted bits exceeds a bit range corresponding to the bits, stops the coding, and if the number of counted bits is less than the bit range corresponding to the bits even after quantized samples are all coded, codes bits that remain not coded after coding in a lower layer is finished, to the extent that the bit range permits.

15. The apparatus of claim 12, wherein the packing unit slices the MDCT-transformed data by referring to a cut-off frequency so that the sliced data corresponds to the plurality of layers.

16. The apparatus of claim 12, wherein the packing unit maps a plurality of quantized samples on a bit plane, and codes the samples in units of symbols

within a bit range allowed in a layer corresponding to the samples, in order from a symbol formed with MSB bits down to a symbol formed with LSB bits.

17. The apparatus of claim 16, wherein the packing unit maps K quantized samples on a bit plane, obtains a scalar value corresponding to the symbol formed with K-bit binary data, and then performs Huffman-coding by referring to the K-bit binary data, the obtained scalar value, and a scalar value corresponding to a symbol higher than a current symbol on the bit plane, where K is an integer.